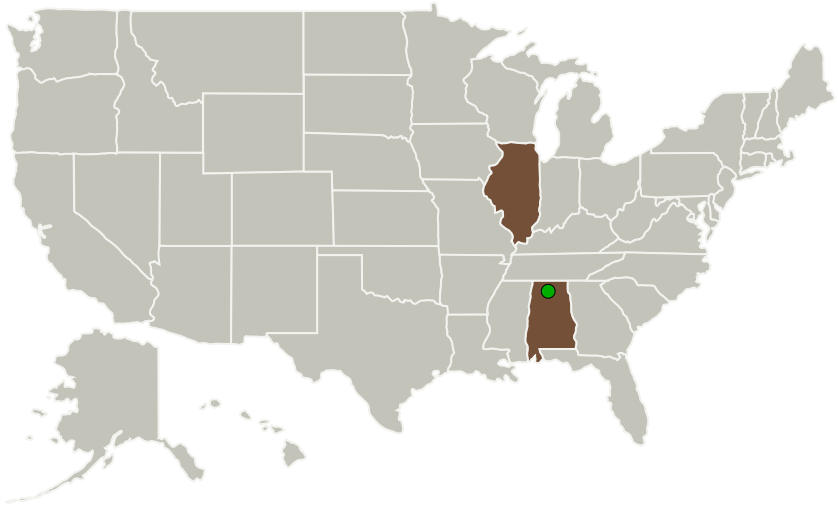
# I-Sail: 2500-Square-Meter Solar Sail Prototype Demonstrator, Phase I

Completed Technology Project (2017 - 2017)

## Project Introduction

A team of CU Aerospace and the University of Illinois at Urbana-Champaign proposes the Phase I design and development of a 25 kg spacecraft for initial flight test of a 2,500 m^2 UltraSail demonstrator, called I-Sail. This technology represents a next-generation high-risk, high-payoff solar sail system for the launch, deployment, stabilization and control of very large (km^2 class) solar sails, enabling very high payload mass fractions for interplanetary and deep space spacecraft. UltraSail is an innovative, non-traditional approach to propulsion technology achieved by combining propulsion and control systems developed for formation-flying microsatellites with an innovative solar sail architecture to achieve controllable sail areas approaching 1 km^2, sail subsystem area densities less than 5 g/m^2, and thrust levels many times those of ion thrusters used for comparable deep space missions. Phase I effort will focus on the design of this next generation I-Sail demonstrator, a two-order of magnitude scale up from the prior subscale 20 m^2 CubeSail hardware, along with potential mission selection with requirements. I-Sail represents the next stage of risk reduction for the UltraSail technology prior to full scale deep space development in the next decade.

## Primary U.S. Work Locations and Key Partners




I-Sail: 2500-Square-Meter Solar Sail Prototype Demonstrator, Phase I Briefing Chart Image

## Table of Contents

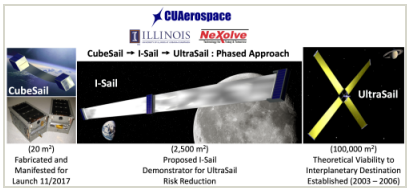
# I-Sail: 2500-Square-Meter Solar Sail Prototype Demonstrator, Phase I

Completed Technology Project (2017 - 2017)

| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| CU Aerospace, LLC | Lead Organization | Industry | Champaign, Illinois |
| Marshall Space Flight Center(MSFC) | Supporting Organization | NASA Center | Huntsville, Alabama |

| Primary U.S. Work Locations | |
|---|---|
| Alabama | Illinois |

## Images




**Briefing Chart Image**
I-Sail: 2500-Square-Meter Solar Sail Prototype Demonstrator, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/129917)*

## Organizational Responsibility

**Responsible Mission Directorate:**
Space Technology Mission Directorate (STMD)

**Lead Organization:**
CU Aerospace, LLC

**Responsible Program:**
Small Business Innovation Research/Small Business Tech Transfer

## Project Management

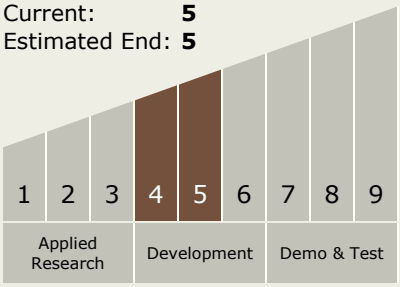
**Program Director:**
Jason L Kessler

**Program Manager:**
Carlos Torrez

**Principal Investigator:**
David L Carroll

## Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



# I-Sail: 2500-Square-Meter Solar Sail Prototype Demonstrator, Phase I

Completed Technology Project (2017 - 2017)

## Technology Areas

**Primary:**

- TX01 Propulsion Systems
  - TX01.4 Advanced Propulsion
    - TX01.4.1 Solar Sails

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System